5-14-2008

UM researcher: Polluted city air may predispose children to diseases later in life

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NEWS RELEASE

May 14, 2008

Contact: Lilian Calderón-Garcidueñas, assistant professor, UM College of Health Professions and Biomedical Sciences, 406-243-4785, **lilian.calderon-garciduenas@umontana.edu**.

UM RESEARCHER: POLLUTED CITY AIR MAY PREDISPOSE CHILDREN TO DISEASES LATER IN LIFE

MISSOULA –

Exposure to severe air pollution at a young age may predispose people to develop Alzheimer's or Parkinson's later in life, according to new research conducted by The University of Montana and the National Institute of Pediatrics in Mexico City.

The findings were published in the latest issue of Toxicological Pathology, an international science journal. The research was funded by the National Institutes of Health.

Dr. Lilian Calderón-Garcidueñas, an assistant professor in UM's Center for Structural and Functional Neuroscience, studied the brains of 47 young people who died of causes unrelated to neurological conditions. Thirty-five came from Mexico City – one of the most polluted cities in the world – while the rest were from two Mexican cities with relatively clean air.

Calderón's research group found that brains from the Mexico City area – even one from a 2-year-old child – showed evidence of neural inflammation and features common to those with Alzheimer's or Parkinson's diseases. The average age of subjects in the study was about 25.

"This suggests that harmful environmental exposures very young in life can be

significant for your brain later when you reach a certain age," she said. "But it may be 50 years before you exhibit symptoms. Alzheimer's and Parkinson's diseases are not sudden. By the time you develop symptoms like cognitive alterations or abnormal movements, you probably have lived with the disease for decades."

Calderón conducted the study in Mexico because people there are less likely to move. In the United States relocation is common, and there are no cities with the extreme pollution recorded in Mexico City.

Her research group concluded that exposure to air pollution causes brain inflammation and an accumulation of amyloid and synuclein proteins in target areas in the brain. These proteins normally are present, but air pollution may play a role in altering their structures to create harmful effects.

Calderón first studied the link between pollution and brain diseases as a graduate student at the University of North Carolina. She published a paper in 2002 detailing pollution's harmful effects on the brains of dogs in urban areas. A 2004 study revealed alterations in the brains of people in their 50s who came from polluted cities.

"The point of this new paper is that it's about very young people," she said. "When you are 50, you are entitled to have some age-related problems. But when you are 11, you aren't supposed to have that. This research shows that if you live all your life in a very polluted area, you do have features that speak of neuroinflammation and you may have a higher risk of developing Alzheimer's or Parkinson's later in life, even with no genetic risk factors.

"This shows that air pollution exposures very young in life could be significant for your brain, and thus there is a need to study the brain effects of air pollution in young children and

in teens," she said.

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